

TAKE A CHANCE

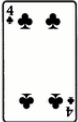
Because this is a game, the students take to it readily. As they play, they make judgements based on their intuitions of what is likely. The task then becomes an introduction to a discussion of probability.


TAKE A CHANCE

MATERIALS
One [1] deck of playing cards and about forty [40] discs

For this task, the cards have the following values:
Ace = 1. *Cards 2-10* = Face Value, i.e. the number written on the card.
Picture cards: Jack = 11, Queen = 12, King = 13

- Find the total value of the deck. Look for counting patterns.
- TAKE A CHANCE**
 - Shuffle the deck and turn the top two cards face up on the table like this:





- Each player now has to consider the chance that the next card turned up will fit between the first two. For example in the case above, 5, 6, 7, 8, 9, 10 will fit between. However Ace, 2, 3, 4, Jack, Queen, King will not fit between.
- If the next card does fit between, you win the round. If not, you lose.
- Cards are shuffled again after each round.

Scoring: Each player begins with 10 discs. For each round a player may risk 1, 2, or 3 discs OR may pass if they think it is too risky. Players must put out the number of discs they are risking *before* the card is turned over. A win means you add discs to your collection. A loss means you return discs to the box.

- The game is won when a player collects 20 discs OR lost when a player loses all their discs.

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MATHEMATICS CONTENT

- Recognise and use patterns in number.
- Make statements about likelihood.
- Estimate and calculate probabilities in a practical situation.
- Systematically list possible outcomes, deduce probability and test predictions experimentally.

LEARNING FEATURES

- Game situation.
- Intuitive concept development.
- Language of chance.
- Prediction based on past events.
- Connecting with many homes through the use of a deck of cards.

ANSWER

- The total value of the deck is 364, but the interest is in the counting strategies the students use to arrive at this answer. For example, who pairs the cards to make fourteens (A/K, 2/Q, 3/J) etc.)? Who adds the terms of the sequence 4, 8, 12, ..., 52? Who adds one suit, then multiplies by four? Who uses a calculator? But, perhaps most of all, who asks and applies the mathematician's question, *Can I check this another way?*
- The second part of the task is a game and has no actual answer. Its value is in the intuitive use of the language and concepts of chance which it generates, and in following the student's experiences with a discussion.

A proven method of promoting this discussion is to play the game with the teacher as dealer for everyone. Discs or counters can still be used, but if there are insufficient, a points system can be used. The children work in pairs, checking each other, until one person scores 20 points.

Scoring could be one point for a win, and zero for a loss. This is also an alternative procedure if it is believed that the use of discs is too closely allied to gambling.

TEACHERS' COMMENTS

- *Playing with cards reminds my children of things they do to relax when they are on holidays or staying at their grandparents'.*
- *Students soon develop a notion of a 'good chance'. When this becomes evident I ask them about the clues which help them decide.*
- *This is a fun activity and by the time I use it to generate a class investigation, it has already helped to develop a positive attitude to the use of mathematics.*
- *Although the students are really playing against the card pack rather than a person, I always pair them up to play this game because using the counters generates so much discussion.*

EVALUATION / ASSESSMENT

- Ask students to explain the 'betweens' they would definitely bet on and the ones they wouldn't.

EXTENSIONS

- In class discussion the teacher can set up any of the situations ranging from 'zero possible cards between' to 'eleven possible cards between'. The students can then be surveyed for the number of discs they would risk in the given situation, This produces interesting first hand data. These intuitive responses can then be checked against the calculated probabilities. For example if the two end cards are 4 and 10, there are 20 cards in the remaining 50 which could produce a win. This is a chance of 2 in 5 of winning. How many students are prepared to take a risk against those odds?
- Another form of investigation involves fixing one 'between' situation, eg: (4, 10) as above, and running many trials to compare the experimental probability with the calculated probability. How many trials does it take before the experimental probability approaches the theoretical value?
- Some children at one school fete set up a 'Between' stall. They used the cards 5 and Queen as the 'ends' all the time. The deck was always shuffled before each play. Players paid 50¢ to turn up the top card. If it was between they got their money back. If it was not between they lost their money. Do you think the stall would have made money for the school?

RELATED TASKS / REFERENCES

- Dice Differences , Task 34
- Diamonds Rectangles, Task 40
- First Down The Mountain, Task 87
- Crazy Animals, Task 102
- 12 Counters, Task 117
- Highest Number 1, Task 127
- Highest Number 2, Task 128
- Win At The Fair, Task 133
- Game Show, Task 162